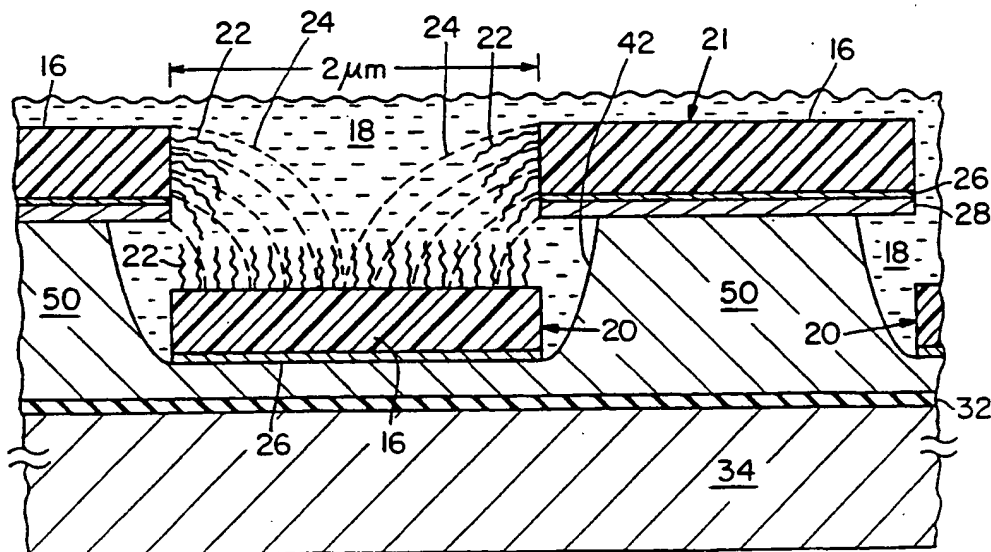


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(54) Title: OPTICAL AND ELECTRICAL METHODS AND APPARATUS FOR MOLECULE DETECTION



**(57) Abstract**

A method and apparatus are disclosed for identifying molecular structures within a sample substance using a monolithic array of test sites formed on a substrate upon which the sample substance is applied. Each test site includes probes formed therein to bond with a predetermined target molecular structure or structures. A signal is applied to the test sites and certain electrical, mechanical and/or optical properties of the test sites are detected to determine which probes have bonded to an associated target molecular structure.

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 93/03829

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl.5                      G 01 N 33/543                      C 12 Q 1/68                      G 01 N 27/07 G 01 N 21/75		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl.5	B 01 L                      G 01 N                      C 12 Q	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	WO,A,9015070 (AFFYMAX TECHNOLOGIES NV) 13 December 1990 cited in the application see page 20, line 6 - page 22, line 24 see page 28, line 14 - line 36 see page 39, line 1 - page 40, line 28; claim 22 ---	1,10,50
X	EP,A,0402917 (BIOCIRCUITS CORP) 19 December 1990	1,10,22
Y	see column 3, line 57 - column 4, line 27 see column 7, line 7 - line 57 see column 9, line 58 - column 11, line 16 see column 16, line 56 - column 21, line 25; figures 1,2 ---                      -/-	2
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<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
14-09-1993		29.12.93
International Searching Authority		Signature of Authorized Officer
EUROPEAN PATENT OFFICE		BINDON C.A.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		Relevant to Claim No.
Category °	Citation of Document, with indication, where appropriate, of the relevant passages	
Y	WO,A,9002327 (AUSTRALIAN MEMBRANE AND BIOTECHNOLOGY RESEARCH INSTITUTE) 8 March 1990 ---	2
A	WO,A,9002327 see page 25, line 13 - page 27, line 35; figures 8-10 ---	3-5
X	WO,A,9005300 (MIDWEST RESEARCH TECHNOLOGIES) 17 May 1990 see page 12, line 1 - page 18, line 8; figures 6-8 ---	1,10,22
A	EP,A,0347579 (MESSERSCHMITT-BÄLKOW-BLOHM GMBH) 27 December 1989 see column 2, line 41 - column 4, line 26 see column 7, line 2 - column 9, line 44 ---	1,10,22
A	US,A,4963245 (WEETALL) 16 October 1990 see column 2, line 12 - column 3, line 13; figures ---	1-3,10,22
P,A	US,A,5187096 (GIAEVER ET AL.) 16 February 1993 see column 2, line 33 - column 5, line 63; figures 1,2 -----	1,2

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 93/03829

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

For further information please see form PCT/ISA/206 mailed 27.09.93.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-5, 10, 22, 50

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.**

US 9303829  
SA 74062

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
The members are as contained in the European Patent Office EDP file on 16/12/93  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US-A- 5187096	16-02-93	None	